

Two new *Draconarius* species and the first description of the male *Draconarius molluscus* from Tiantangzhai National Forest Park, China (Araneae: Agelenidae: Coelotinae)

Hai-Juan Xie and Jian Chen¹: College of Life Sciences, Hubei University, Wuhan 430062, Hubei, China

Abstract. Three *Draconarius* species collected from the Tiantangzhai National Forest Park, China are studied, including two new species, *D. peregrinus* sp. nov. and *D. tiantangensis* sp. nov. The male *D. molluscus* (Wang et al. 1990) is reported for the first time.

Keywords: Taxonomy, diagnosis, new species

Draconarius Ovtchinnikov 1999 is one of the most diverse genera in the subfamily Coelotinae (Liu & Li 2009). At present, a total of 204 *Draconarius* species are known worldwide, among which 110 are recorded from China (Platnick 2010; Wang 2010). Many *Draconarius* species are currently described from only male or female specimens. Most of those described from both sexes are only based on a small number of individuals, and some sexes may be incorrectly matched. As a result, a morphological phylogenetic analysis at this moment would be challenging. Wang divided these species into seven groups in 2003, but the other unplaced species remain to be sorted (Wang 2003).

Recent field surveys in Tiantangzhai National Forest Park, China have yielded three *Draconarius* species, which we describe in the current paper. Tiantangzhai National Forest Park (Fig. 40), located in the Dabie Mountains between Hubei and Anhui provinces in China, is part of the watershed of Yangtze River and Huai River. With an average elevation of 1000 m, its highest peak reaches 1729 m, the second highest peak in Dabie Mountains. Tiantangzhai has a subtropical climate, with typical mild climate accompanied by abundant rainfall. The fauna is typical for the transition zone between the Palaearctic and Oriental regions: e.g., Palearctic Otididae, such as bustard; Oriental Suidae and Viverridae, such as boar and small Indian civet. Nearly 1400 species of plants and 600 species of animals exist here, including giant salamanders and leopards. Tiantangzhai is the last piece of virgin habitat in eastern China.

METHODS

All specimens used in the current study are deposited in the College of Life Sciences, Hubei University. We examined specimens with an Olympus SZX16 stereomicroscope. Further details were studied with an Olympus BX51 compound microscope. We examined and illustrated male palps and female epigyna after dissecting them from the spider bodies. All illustrations were made using rotring isograph pens (0.20, 0.30 mm) on parchment papers.

All measurements, obtained using an Olympus SZX16 stereomicroscope, are given in millimeters. Eye diameters were taken at the widest point. The total body length does not include the length of the chelicerae or spinnerets. The leg measurements are shown as total length (femur, patella + tibia, metatarsus, tarsus). The terminology used in the text and in

the figure legends mainly follows Wang (2002) and Liu & Li (2010). Photos of male palp and female epigynum will be submitted to and available from Li & Wang (2009).

Abbreviations used in the text and figures are: A = atrium; ALE = anterior lateral eye; AME = anterior median eye; AME–ALE = distance between AME and ALE; AME–AME = distance between AMEs; ALE–PLE = distance between ALE and PLE; C = conductor; CD = copulatory duct; CDA = dorsal apophysis of the conductor; CF = cymbial furrow; E = embolus; ET = epigynal teeth; FD = fertilization duct; H = hood; LTA = lateral tibial apophysis; MA = median apophysis; PA = patellar apophysis; PLE = posterior lateral eye; PME = posterior median eye; PME–PLE = distance between PME and PLE; PME–PME = distance between PMEs; RTA = retrolateral tibial apophysis; S = spermathecae; SH = spermathecal head; ST = subtegulum; T = tegulum; TS = tegular sclerite.

TAXONOMY

Agelenidae C.L. Koch 1837
Draconarius Ovtchinnikov 1999
Draconarius molluscus Wang et al. 1990
Figs. 1–12

Coelotes molluscus Wang et al. 1990:214, figs. 86, 87 (♂); Song et al. 1999:376, figs. 221G, H (♀).

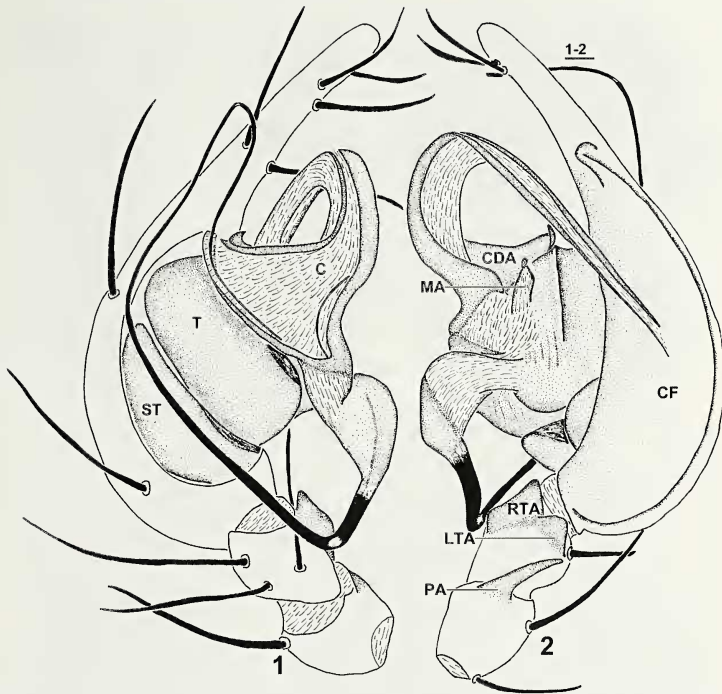
Draconarius molluscus Wang 2002:67 (♂); Wang 2003:539, figs. 42A–B, 96D (♀).

Materials examined.—Tiantangzhai National Forest Park, China, Xin Xu and Haijuan Xie, 3♂, 6♀ (27 September 2009), 1♀ (28 September 2009), 1♂, 3♀ (29 September 2009).

Diagnosis.—This species is similar to *D. lutulentus* (Wang et al. 1990), but can be distinguished by the long cymbial furrow (more than half of cymbial length), the short, square tegular sclerite, the absence of epigynal teeth and the long, anteriorly converging spermathecal stalks (Figs. 1–12).

Description.—*Male:* Total length 5.57–5.80. Prosoma 2.82 long, 1.98 wide; opisthosoma 2.62 long, 1.89 wide. Eye: AME 0.15; ALE 0.17; PME 0.17; PLE 0.18; AME–AME 0.05; AME–ALE 0.03; ALE–PLE 0.0; PME–PME 0.08; PME–PLE 0.07. Clypeus height 0.23. Leg formula: IV, I, II, III; leg: I: 10.68 (2.68, 3.70, 2.73, 1.57); II: 9.29 (2.45, 3.00, 2.48, 1.36); III: 8.56 (2.42, 2.78, 2.04, 1.32); IV: 10.78 (2.85, 3.61, 3.03, 1.29). Chelicerae with 3 promarginal and 3 retromarginal teeth. Patellar apophysis long, sword-shaped; RTA short, less than half tibial length, with distal end protruding beyond

¹Corresponding author. E-mail: chenjian_hb@tom.com



Figures 1, 2.—*Draconarius molluscus*, male. 1. Palp, prolateral view; 2. Palp, retrolateral view. Scale line = 0.1 mm.

distal tibia; lateral tibial apophysis large, closed to RTA; cymbial furrow more than half of cymbial length; conductor long, slender, slightly curved, with large basal lamella; conductor dorsal apophysis long, with sharp distal end; median apophysis short, slightly curved distally; embolus filiform, long, originating retrolaterally (Figs. 1–3, 6, 8–10).

Female.—See description of Wang (2003).

Relationships.—*Draconarius molluscus* is a member of the *lutulentus*-species group.

Distribution.—China (Anhui, Hubei, Jiangxi).

Draconarius peregrinus sp. nov.
Figs. 13–27

Type species.—Holotype ♂, Tiantangzhai National Forest Park, China, 26 September 2009, Xin Xu and Haijuan Xie. Paratypes: 1♂, 3♀ (same date as holotype); 3♀ (27 September 2009).

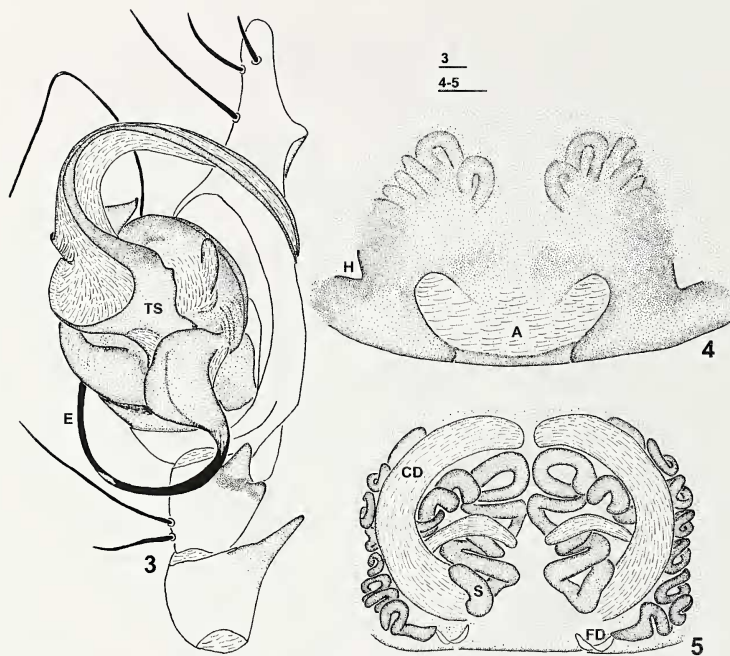
Etymology.—The specific name is taken from the Latin adjective *peregrinus*, meaning “bizarre”, referring to the strange and unique distal part of embolus.

Diagnosis.—The male of this new species is similar to *Draconarius magicus* (Liu et al. 2010) in having a broad and bifurcated embolus, but can be distinguished from it by the absence of a patellar apophysis, and the large lateral tibial apophysis situated close to RTA; the proximally originating

embolus in the male. The female can be distinguished from other *Draconarius* by the large, folded, wrinkled copulatory ducts and the long spermathecal stalks, which are covered by copulatory ducts visible in dorsal view (Figs. 13–27).

Description.—*Male*: Total length 6.84–8.51. Prosoma 3.79 long, 2.30 wide; opisthosoma 4.19 long, 2.80 wide. Eye: AME 0.13; ALE 0.22; PME 0.19; PLE 0.20; AME–AME 0; AME–ALE 0.03; ALE–PLE 0; PME–PME 0.05; PME–PLE 0.10. Clypeus height 0.16. Leg formula: IV, I, II, III; leg: I: 7.99 (2.50, 2.68, 1.67, 1.14); II: 7.54 (2.14, 2.31, 1.87, 1.22); III: 6.41 (1.67, 2.34, 1.33, 1.07); IV: 9.92 (2.71, 3.28, 2.66, 1.27). Chelicerae with 3 promarginal and 2 retromarginal teeth. Patellar apophysis absent; RTA short, approximately half tibial length; lateral tibial apophysis broad, closed to RTA; cymbial furrow long, more than half of cymbial length; conductor short, simple; dorsal apophysis moderately large; median apophysis long and slender, spoon-like; embolus broad, originating retrolaterally, with slender bifurcate distal part, one apex sword-shaped, the other oval-shaped (Figs. 13–16, 20, 22–24).

Female: Total length 6.79–10.07. Prosoma 3.90 long, 2.34 wide; opisthosoma 4.14 long, 2.86 wide. Eye: AME 0.14; ALE 0.23; PME 0.20; PLE 0.21; AME–AME 0; AME–ALE 0.04; ALE–PLE 0; PME–PME 0.07; PME–PLE 0.12. Clypeus height 0.19. Leg formula: IV, I, II, III; leg: I: 8.19 (2.45,



Figures 3–5.—*Draconarius molluscus*. 3. Male palp, ventral view; 4. Female epigynum, ventral view; 5. Female epigynum, dorsal view. Scale line = 0.1 mm.

2.85, 1.66, 1.23); II: 6.98 (2.07, 2.44, 1.44, 1.03); III: 6.35 (1.63, 2.26, 1.37, 1.09); IV: 10.00 (2.71, 3.37, 2.76, 1.16). Chelicerae with 3 promarginal and 2 retromarginal.

Epigynal teeth small, situated anteriorly laterad of the atrium; atrium broad; copulatory ducts broad, folded, originating anteriorly or posteriorly, close together; spermathecal stalks long, totally hidden by the copulatory ducts; spermathecal heads small, also totally hidden by the copulatory ducts; spermathecae oval, widely separated (Figs. 17–19, 21, 25–27).

Relationships.—*Draconarius peregrinus* sp. nov. is considered congeneric with the type species of the genus *Draconarius*, as it exhibits two retrolateral teeth; a long cymbial furrow; spoon-like median apophysis; dorsal apophysis of conductor present. Female epigynum with two epigynal teeth, copulatory ducts broad. However, the bifurcate distal part of the embolus makes its generic placement questionable.

Distribution.—China (Hubei, Anhui).

Draconarius tiantangensis sp. nov.

Figs. 28–39

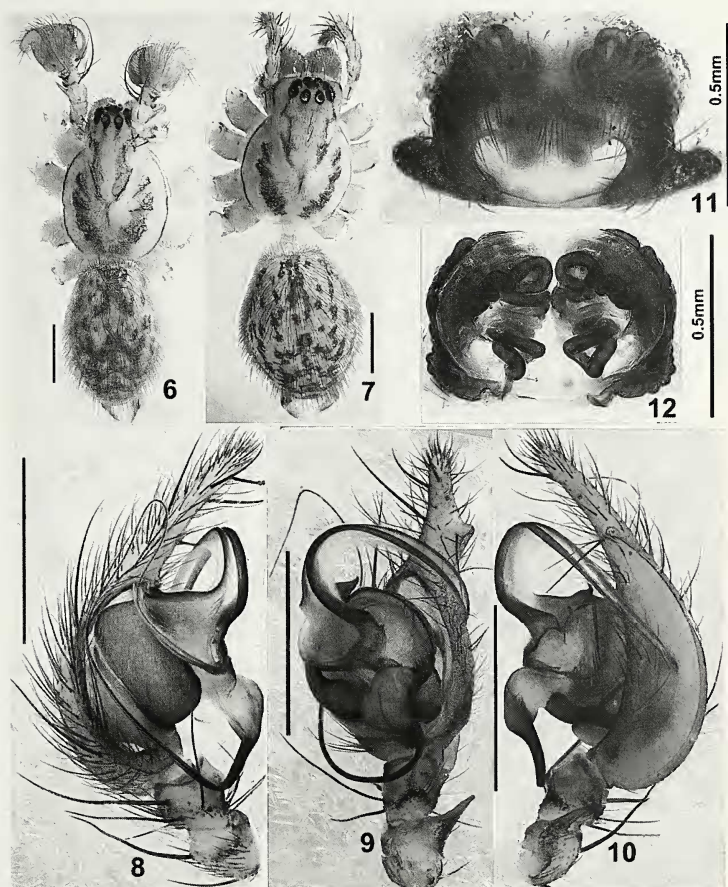
Type species.—Holotype ♂, Tiantangzhai National Forest Park, China, 27 September 2009, Xin Xu and Haijuan Xie. Paratypes: 2♂ (same date as for holotype).

Etymology.—The specific name is an adjective, referring to the type locality, Tiantangzhai.

Diagnosis.—This new species is similar to *Draconarius aspinatus* (Wang et al. 1990) in the absence of a patellar apophysis, the presence of long cymbial furrow, the simple conductor, the small atrium and the simple large spermathecae, but can be distinguished by the significantly smaller body, with a male length of 4.32mm, the latter is 10 mm long (Wang et al. 1990); and the lateral apophysis broad, close to RTA in this new species, but small, far from RTA in *D. aspinatus* (Figs. 28–39).

Description.—*Male*: Total length 4.32. Prosoma 2.01 long, 1.44 wide; opisthosoma 2.10 long, 1.34 wide. Eye: AME 0.08; ALE 0.13; PME 0.14; PLE 0.15; AME–AME 0; AME–ALE 0; ALE–PLE 0; PME–PME 0.03; PME–PLE 0.02. Clypeus height 0.14. Leg formula: IV, I, II, III; leg: I: 5.17 (1.39, 1.69, 1.25, 0.84); II: 4.86 (1.39, 1.57, 1.13, 0.77); III: 4.51 (1.19, 1.48, 1.19, 0.65); IV: 6.37 (1.66, 2.09, 1.84, 0.78). Chelicerae with 3 promarginal and 2 retromarginal teeth. Patellar apophysis absent; RTA long, with distal end extending beyond tibia; lateral tibial apophysis broad, close to RTA; cymbial furrow long, more than half of cymbial length; conductor simple; dorsal apophysis of conductor semicircular in the ventral view; median apophysis slender, elongated, spoon-shaped; embolus long, filiform, originating proximally (Figs. 28–30, 33, 35–37).

Female: Total length 4.36–4.97. Prosoma 1.85 long, 1.47 wide; opisthosoma 2.16 long, 1.41 wide. Eye: AME 0.09; ALE



Figures 6–12.—*Draconarius molluscus*. 6. Male, dorsal view; 7. Female, dorsal view; 8. Male palp, prolateral view; 9. Male palp, ventral view; 10. Male palp, retrolateral view; 11. Female epigynum, ventral view; 12. Female epigynum, dorsal view. Scale line = 1.0 mm unless stated otherwise.

0.14; PME 0.15; PLE 0.16; AME-AME 0; AME-ALE 0; ALE-PLE 0; PME-PME 0.05; PME-PLE 0.04. Clypeus height 0.15. Leg formula: IV, I, II, III; leg: I: 4.94 (1.42, 1.74, 1.05, 0.73); II: 4.23 (1.26, 1.51, 0.80, 0.66); III: 4.14 (1.23, 1.28, 0.99, 0.64); IV: 5.17 (1.41, 1.86, 1.24, 0.66). Chelicerae with 3 promarginal and 2 retromarginal. Epigynal teeth short, widely separated, situated anteriorly laterad of atrium; atrium small, situated anteriorly near epigastric furrow; copulatory ducts small, originating posteriorly; spermathecal heads long and slender; spermathecae large, close to each other (Figs. 31, 32, 34, 38, 39).

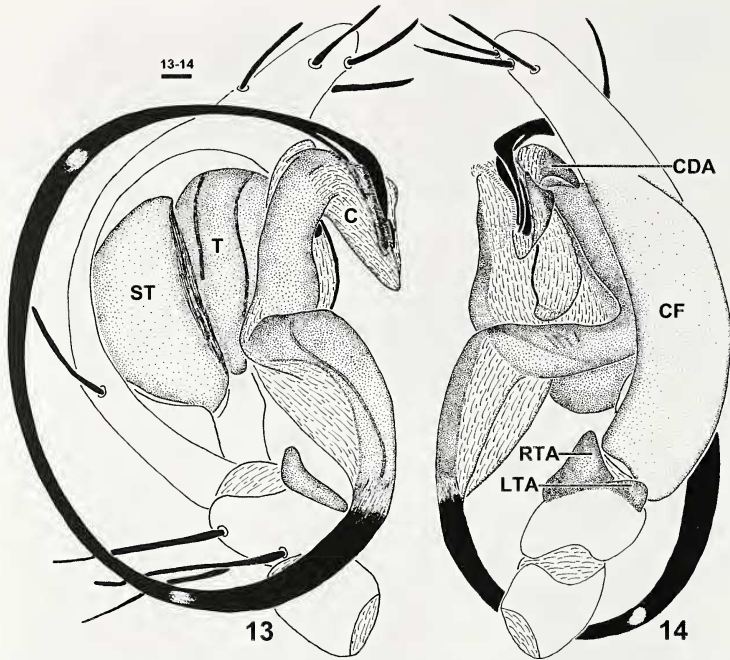
Relationships.—*Draconarius tiantangensis* sp. nov. exhibits a typical *Draconarius* in having a lateral tibial apophysis; a long cymbial furrow; a conductor dorsal apophysis; a spoon-

shaped median apophysis; and a long embolus. The female epigynum with epigynal teeth short, widely separated; spermathecae broad. *Draconarius tiantangensis* sp. nov. is a member of the *venustus*-species group.

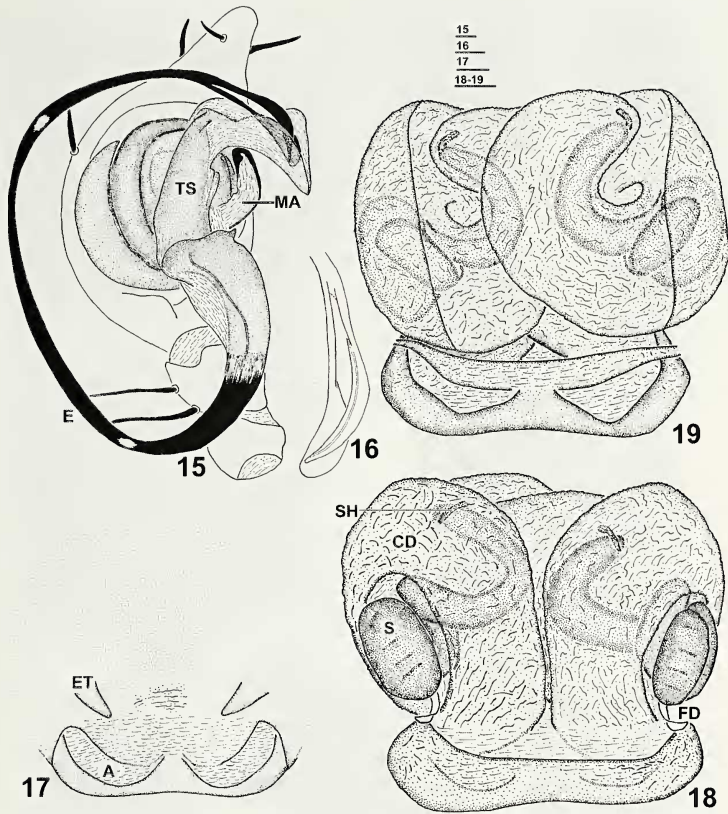
Distribution.—China (Hubei).

ACKNOWLEDGMENTS

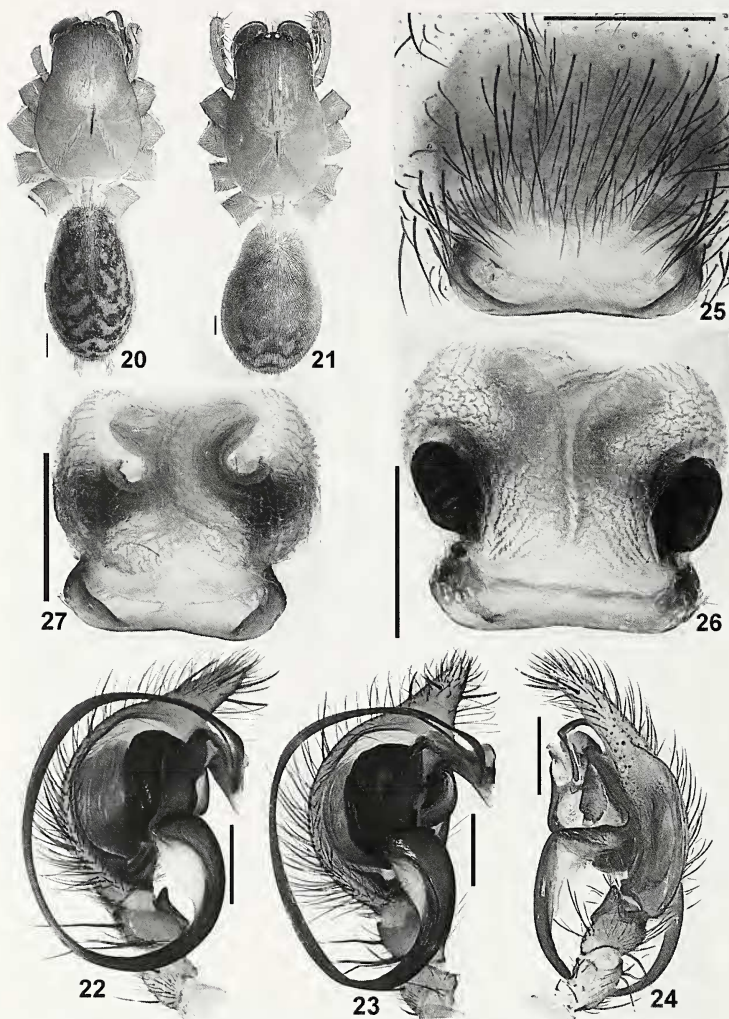
The manuscript benefited from comments by Dr. Xin-Ping Wang (Gainesville, Florida), and two anonymous reviewers. The field collection was supported by Fengxiang Liu. Our thanks also are due to Jie Liu, Hao Yu, Zhenyu Jin, and Xin Xu for their comments on the manuscript. This study was supported by the National Natural Sciences Foundation of China (NSFC-39870105/30370206) and by the Ministry of



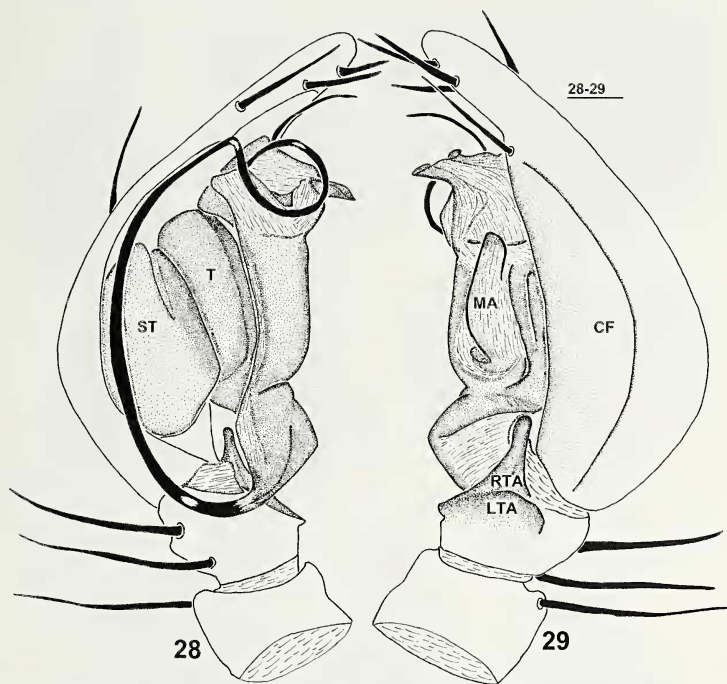
Figures 13, 14.—*Draconarius peregrinus* sp. nov., male. 13. Palp, prolateral view; 14. Palp, retrolateral view. Scale line = 0.1 mm.



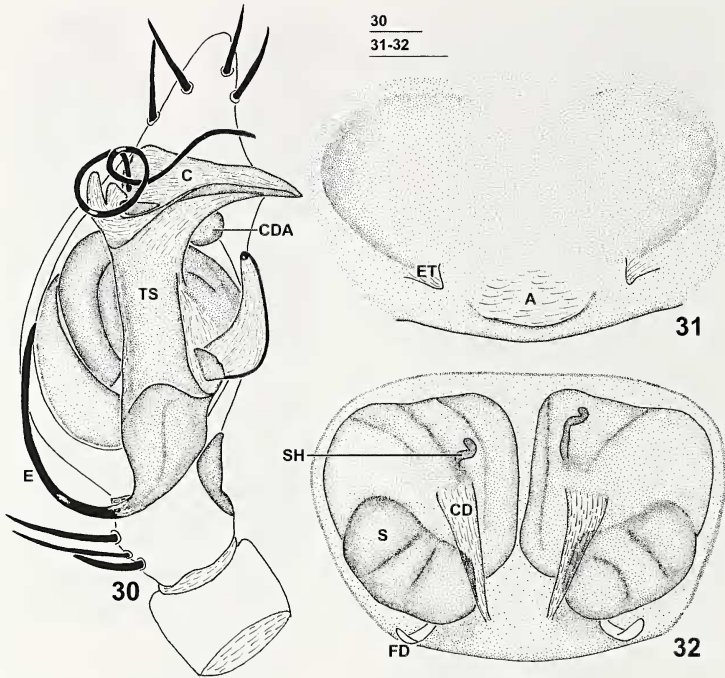
Figures 15-19.—*Draconarius peregrinus* sp. nov. 15. Male palp, ventral view; 16. distal part of embolus, ventral view; 17. Female epigynum, ventral view; 18. Female epigynum, dorsal view; 19. Vulva, ventral view. Scale line=0.1mm.



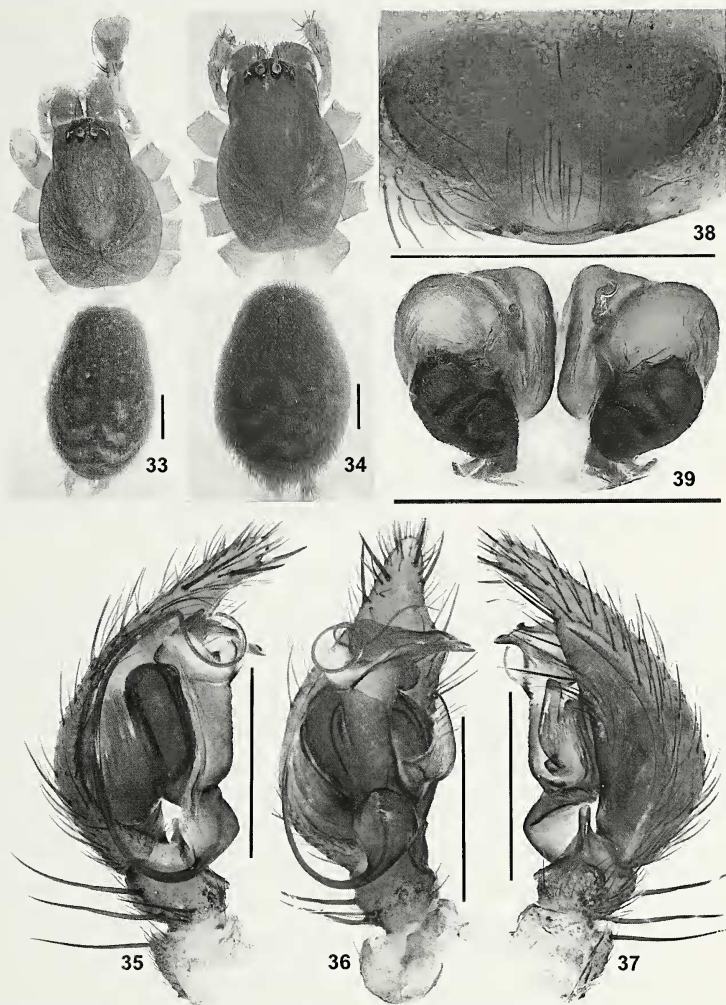
Figures 20-27.—*Draconarius peregrinus* sp. nov. 20. Male, dorsal view; 21. Female, dorsal view; 22. Male palp, prolateral view; 23. Male palp, ventral view; 24. Male palp, retrolateral view; 25. Female epigynum, ventral view; 26. Female epigynum, dorsal view; 27. Vulva, ventral view. Scale line=0.5mm.



Figures 28, 29.—*Draconarius tiantangensis* sp. nov., male. 28. Palp, prolateral view; 29. Palp, retrolateral view. Scale line = 0.1mm.



Figures 30-32.—*Draconarius tiantangensis* sp. nov. 30. Male palp, ventral view; 31. Female epigynum, ventral view; 32. Female epigynum, dorsal view. Scale line = 0.1 mm.



Figures 33–39.—*Draconarius tiantangensis* sp. nov. 33 Male, dorsal view; 34 Female, dorsal view; 35 Male palp, prolateral view; 36 Male palp, ventral view; 37 Male palp, retrolateral view; 38 Female epigynum, ventral view; 39 Female epigynum, dorsal view. Scale line = 0.5 mm.



Figure 40.—Location map of the Tiantangzhai National Forest Park.

Science and Technology of the People's Republic of China (MOST grant no. 2006FY120100/2006FY110500).

LITERATURE CITED

- Li, S.Q. & X.P. Wang. 2010. Endemic spiders in China. Online at <http://www.ChineseSpecies.com> (accessed 11 May 2010).
- Liu, J. & S.Q. Li. 2009. One new *Draconarius* species (Araneae, Amaurobiidae) from Hainan Island, China. *Acta Zootaxonomica Sinica* 34:730–732.
- Liu, J., S.Q. Li & D.S. Pham. 2010. The coelotine spiders from three national parks in Northern Vietnam (Araneae, Amaurobiidae). *Zootaxa* 2377:1–93.
- Platnick, N.I. 2010. The World Spider Catalog, Version 10.5. American Museum of Natural History, New York. Online at <http://research.amnh.org/entomology/spiders/catalog/index.html> (accessed on 11 May 2010).
- Song, D.X., M.S. Zhu & J. Chen. 1999. The Spiders of China. Hubei Science and Technology Publishing House, Shijiazhuang, China.
- Wang, J.F., C.M. Yin, X.J. Peng & L.P. Xie. 1990. New species of the spiders of the genus *Coelotes* from China (Araneae: Agelenidae). Pp. 172–253. In *Spiders in China: One Hundred New and Newly Recorded Species of the Families Araneidae and Agelenidae*. (C.M. Yin & J.F. Wang, eds.). Hunan Normal University Press, Changsha, China.
- Wang, X.P. 2002. A generic-level revision of the spider subfamily Coelotinae (Araneae, Amaurobiidae). *Bulletin of the American Museum of Natural History* 269:1–150.
- Wang, X.P. 2003. Species revision of the coelotine spider genera *Bifidocoelotes*, *Coronilla*, *Draconarius*, *Femoracoelotes*, *Leptocoelotes*, *Longicoelotes*, *Platocoelotes*, *Spiricoelotes*, *Tegeocoelotes*, and *Tonsilla* (Araneae: Amaurobiidae). *Proceedings of the California Academy of Sciences* 54:499–662.
- Wang, X.P. 2010. Online Coelotinae, version 2.0. Online at <http://www.amaurobiidae.com> (accessed on 11 May 2010).

Manuscript received 3 June 2010, revised 21 November 2010.